

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: M. OOE, et al.

Serial No.: 10/585,738

Filed: JULY 12, 2006

For: PHOTSENSITIVE POLYMER COMPOSITION, METHOD OF  
PRODUCING PATTERN AND ELECTRONIC PARTS

Group AU: 1785

Examiner: Gerard T. Higgins

Confirm. No. 7230

**DECLARATION UNDER 37 CFR 1.132**

Commissioner for Patents

P.O.Box 1450

Alexandria, Virginia 22313-1450

SIR:

I, Masayuki Ooe, a citizen of Japan, residing at 2-24-6, Juou-cho, Hitachi  
City, Ibaraki, Japan,

DECLARE THAT:

1. I graduated in 1987 from the School of Interdisciplinary Science and

Engineering in the Graduate School of Kyushu University, Department of Molecular Engineering.

2. I joined Hitachi Chemical Co., Ltd. in October 1996, and was transferred to Hitachi Chemical DuPont Microsystems Ltd. in November 1997, and my present area of research is investigation into development and mass production of new photosensitive, alkali-developed, positive-type polyimides and polybenzoxazoles.
3. I am one of the inventors named in U.S. Patent Application No. 10/585,738, filed July 12, 2006 (the present application), and am aware of the Office Action mailed on October 6, 2010 concerning the present application.
4. I conducted the following experiments under my direct supervision:

#### **Experiment D**

The photosensitive polymer composition obtained in Example 1 of the present Specification (containing 2,2-bis[3,5-bis(hydroxymethyl)-4-hydroxyphenyl]-1,1,1,3,3,3-hexafluoropropane as component (C)) was applied on a rotating silicon wafer by a spinner, and heated and dried on a hot plate at 120°C for 3 minutes to obtain a coating film of 12.0μm. An exposure treatment was given to this coating film via a reticle by using an i line stepper (supplied from Canon) as an exposure equipment and changing exposure amounts in the

range of 100 to 810 mJ/cm<sup>2</sup> with an increment of 10 mJ/cm<sup>2</sup>. Then, a paddle development for 90 seconds was performed using an aqueous solution of 2.38% by weight of tetramethyl ammonium hydroxide as a developer, and the coating film was washed with purified water to obtain a pattern. The obtained pattern was heated at 320°C under a nitrogen atmosphere for one hour, to obtain a patterned polybenzoxazole film. Glass transition temperature (T<sub>g</sub>) and transparency thereof were measured. The transparency was measured by determining the L-a+b value of Lab color system using an apparatus TC-1 (manufactured by Tokyo Denshoku Co., Ltd.). High L-a+b value means high transparency.

As a result, T<sub>g</sub> was 320°C, and L-a+b was 94.3.

### **Experiment E**

A patterned polybenzoxazole film was obtained and T<sub>g</sub> and transparency thereof were measured in the same manner as in Experiment D, except that the photosensitive polymer composition obtained in Comparative Example 4 of the present Specification (containing 2,2-bis[3,5-bis(hydroxymethyl)-4-hydroxyphenyl]propane as component (C)) was used in place of the photosensitive polymer composition obtained in Example 1.

As a result, T<sub>g</sub> was 318°C, and L-a+b was 91.7.

## **Experiment F**

A patterned polybenzoxazole film was obtained and Tg and transparency thereof were measured in the same manner as in Experiment D, except that the photosensitive polymer composition obtained in Additional Comparative Example C in Ooe's Declaration submitted concurrently with the Request for Reconsideration filed on January 25, 2010 (containing bis(2-hydroxy-3-hydroxymethyl-5-methylphenyl)methane as component (C)) was used in place of the photosensitive polymer composition obtained in Example 1.

As a result, Tg was 303°C, and L-a+b was 91.8.

5. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United State Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Feb. 21, 2011

Masayuki Ooe

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